

Metal Finishing Index to Volume 91

January—December 1993

A

- Abrasive blasting
carbon dioxide blasting, Sept. 9
of inorganic "metallic" finishes, Feb. 14
- Abrasive finishing, magnetic, July 21
- ABS plastic, roughness on, Aug. 11
- Acceptance sampling, overview of, Feb. 34
- Acid etch primers, pretreatment, Aug. 67
- AC impedance, for accelerated corrosion testing, Dec. 35
- Acrylics, technical developments in, Feb. 53
- Activation solution, reliable test for checking, July 26
- Adhesion
alkyds and, Aug. 68
on beryllium-copper alloys, Dec. 61
brass terminal pins and, July 26
heat-quench test for, Feb. 62
improving nickel adhesion to aluminum, Aug. 11
- ion plating can improve coating adhesion, Sept. 15
- phosphate coating stability and, May 52
- polyurethane coatings and, July 13
- poor, May 53
- poor degreasing and, Oct. 30
- testing for, Feb. 60
- Adsorption, for control of VOC emissions, Nov. 60, Nov. 68
- Aerospace coatings
low-cost transfer-efficient paint spray equipment, Aug. 59
- solar selective coating for use on aerospace components, June 57
- AESF Sur/Fin '93, technical program and exhibits, June 19
- Agitation
autocatalytic nickel-phosphorus-boron alloys and, July 47
- for electroplating printed circuit boards, May 23
- Air bubbling agitation, for electroplating printed circuit boards, May 23
- Airline and Aerospace Finishing
Brush Plating and Anodizing for the Aircraft and Aerospace Industries, Mar. 27
- Gold Plating on Magnesium Alloys for Space Applications, Mar. 34
- New Challenges for Shot Peening of Aircraft Gas Turbine Engine Components, Mar. 21
- Starch Media Blasting for Aerospace Finishing Applications, Mar. 15
- Alcohol, for analysis, Feb. 62
- Alkyd coatings
coating damage during assembly, Aug. 67
- handling two drying times on one line, Sept. 22
- poor adhesion and, Aug. 68
- technical developments in, Feb. 53
- Alloy 42, overetching lead frames and, Nov. 50
- Alloy 52, splotchy immersion plate and, Aug. 11
- Almen strip repeatability, shot peening and, Mar. 22
- Aluminum and aluminum alloys
acid etch primers and, Aug. 67
- alternate for zincating aluminum, Oct. 33
- chelates for aluminum etching, Apr. 73
- degreasing of, July 13
- electrodeposition of, Feb. 17
- filiform corrosion monitoring under

- anticorrosion primers, July 51
- hard coat anodizing 319 cast aluminum castings, May 53
- hardcoat distribution, June 114
- improving nickel adhesion to zincated aluminum, Aug. 11
- insufficient mixing and, Mar. 64
- in metallic paint, Oct. 39
- oxide removal from, July 26
- phosphating treatment for car bodies with aluminum alloy parts, Apr. 7
- poor black color in anodizing, May 53
- prolonging anodizing seal bath life, Oct. 33
- starch media blasting for aerospace finishing applications and, Mar. 15
- ternary coatings produced by steered arc ion plating, Apr. 19
- Aluminum Finishing
Accelerated Corrosion Testing, Part II: Description of Three Test Methods, Dec. 35
- A Chromium-Free Conversion Coating for Aluminum, Dec. 46
- Decorative Plating on Aluminum, Dec. 16
- A Status Report on Art Form and Decorative Applications for Color Anodizing, Dec. 9
- Surface Preparation of the All-Aluminum Car Body before Painting, Dec. 57
- Thin Anodic Aluminum Oxide Films with Unusual Morphology, Dec. 27
- American Chemical Society (ACS), detection limit methodology of, Apr. 64
- Amine additives, for improving stability of phosphate coatings, June 89
- Amine vapor catalyst, in no-bake curing of urethanes, Jan. 62
- Annual Reviews
Technical Developments in 1992: Inorganic "Metallic" Finishes, Processes, and Equipment, Feb. 13
- Technical Developments in 1992: Organic Coatings, Processes and Equipment, Feb. 13
- Anodes and accessories
anodes in electropolishing of high nickel alloys, June 103
- hardcoat distribution, June 114
- white nickel plate, June 114
- Anodizing
accelerated corrosion testing, Sept. 50, Dec. 35
- acid etch primers, Aug. 67
- art form and decorative applications for color anodizing, Dec. 8
- blue finish for titanium, May 53
- brush plating and anodizing for the aircraft and aerospace industries, Mar. 27
- hard anodizing, Aug. 33
- hard coating 319 castings, May 53
- heat exchanger failure, May 53
- inorganic "metallic" finishes, Feb. 16
- integral black anodizing on magnesium alloys, June 57
- poor black color in, May 53
- prolonging anodizing seal bath life, Oct. 33
- starch media blasting for aerospace finishing applications, Mar. 15
- thin anodic aluminum oxide films with unusual morphology, Dec. 27

- Anticorrosion primers, monitoring of filiform corrosion under, July 51
- Antimony and antimony alloys
citrate solutions in electrodeposition of, Jan. 57
- converting silver brighteners, Feb. 62
- Atmosphere, effect of on automotive chassis coatings, May 43
- Audits, in quality control, June 66
- Augmented energy deposition, coating adhesion and, Sept. 15
- Automatic process control, on-line measurement in, Oct. 45
- Automotive finishing
atmospheric exposure of automotive coatings, May 43
- surface preparation of all-aluminum car body before painting, Dec. 57
- Automotive Finishing
Automated Rinsing/Drying of Truck Bodies to Improve Final Paint Finish, Oct. 51
- Automotive Applications of Electroless Nickel, Oct. 70
- The Leading Edge of Electrodeposition Technology, Oct. 59
- New Rotary Bell for Metallic Paint Application, Oct. 39
- On-Line Measurement of Paint Appearance on Car Bodies, Oct. 45
- Recycling of Water-Based Paint, Oct. 23
- B
- Barium, electrodeposition of, Feb. 21
- Bent strip method, for assessing internal stress in electrodeposited alloys, Apr. 59
- Benzene-*m*-disulfone (BDS), effects of on electroformed nickel alloys, June 107
- Beryllium-copper alloy, electroless nickel on, Dec. 61
- Best available control technology (BACT), compliance with, July 43
- Black carbon paints, for spacecraft, June 57
- Black electrolytic process, high-speed, development of, Feb. 20
- Blackening, of electroless nickel, Dec. 61
- Blistering
during reflow, Jan. 63
- on leaded brass, Feb. 62
- phosphating treatment for car bodies with aluminum alloy parts, Apr. 7
- poor adhesion and, May 53
- Blocked accelerator, in urethane coatings, Jan. 62
- Blushing, polyurethane coating and, June 82
- Bonding adhesives, removal of, Mar. 17, Mar. 18
- Boron and boron alloys, autocatalytic nickel-phosphorus-boron alloys, May 19, July 47, Aug. 23
- Brass
blisters on leaded brass, Feb. 62
- brown spots on plated surfaces, July 26
- electroless nickel on copper, Dec. 61
- failed adhesion test, July 26
- high finish for reflectors, June 114
- matching bronze finishes, Apr. 72
- pickling in hydrochloric acid, Feb. 62
- poor adhesion and, May 53
- refinishing leaded brass, Dec. 61
- Bridging

Metal Finishing Index to Volume 91

January—December 1993

A

- Abrasive blasting
carbon dioxide blasting, Sept. 9
of inorganic "metallic" finishes, Feb. 14
- Abrasive finishing, magnetic, July 21
- ABS plastic, roughness on, Aug. 11
- Acceptance sampling, overview of, Feb. 34
- Acid etch primers, pretreatment, Aug. 67
- AC impedance, for accelerated corrosion testing, Dec. 35
- Acrylics, technical developments in, Feb. 53
- Activation solution, reliable test for checking, July 26
- Adhesion
alkyds and, Aug. 68
on beryllium-copper alloys, Dec. 61
brass terminal pins and, July 26
heat-quench test for, Feb. 62
improving nickel adhesion to aluminum, Aug. 11
- ion plating can improve coating adhesion, Sept. 15
- phosphate coating stability and, May 52
- polyurethane coatings and, July 13
- poor, May 53
- poor degreasing and, Oct. 30
- testing for, Feb. 60
- Adsorption, for control of VOC emissions, Nov. 60, Nov. 68
- Aerospace coatings
low-cost transfer-efficient paint spray equipment, Aug. 59
- solar selective coating for use on aerospace components, June 57
- AESF Sur/Fin '93, technical program and exhibits, June 19
- Agitation
autocatalytic nickel-phosphorus-boron alloys and, July 47
- for electroplating printed circuit boards, May 23
- Air bubbling agitation, for electroplating printed circuit boards, May 23
- Airline and Aerospace Finishing
Brush Plating and Anodizing for the Aircraft and Aerospace Industries, Mar. 27
- Gold Plating on Magnesium Alloys for Space Applications, Mar. 34
- New Challenges for Shot Peening of Aircraft Gas Turbine Engine Components, Mar. 21
- Starch Media Blasting for Aerospace Finishing Applications, Mar. 15
- Alcohol, for analysis, Feb. 62
- Alkyd coatings
coating damage during assembly, Aug. 67
- handling two drying times on one line, Sept. 22
- poor adhesion and, Aug. 68
- technical developments in, Feb. 53
- Alloy 42, overetching lead frames and, Nov. 50
- Alloy 52, splotchy immersion plate and, Aug. 11
- Almen strip repeatability, shot peening and, Mar. 22
- Aluminum and aluminum alloys
acid etch primers and, Aug. 67
- alternate for zincating aluminum, Oct. 33
- chelates for aluminum etching, Apr. 73
- degreasing of, July 13
- electrodeposition of, Feb. 17
- filiform corrosion monitoring under

- anticorrosion primers, July 51
- hard coat anodizing 319 cast aluminum castings, May 53
- hardcoat distribution, June 114
- improving nickel adhesion to zincated aluminum, Aug. 11
- insufficient mixing and, Mar. 64
- in metallic paint, Oct. 39
- oxide removal from, July 26
- phosphating treatment for car bodies with aluminum alloy parts, Apr. 7
- poor black color in anodizing, May 53
- prolonging anodizing seal bath life, Oct. 33
- starch media blasting for aerospace finishing applications and, Mar. 15
- ternary coatings produced by steered arc ion plating, Apr. 19
- Aluminum Finishing
Accelerated Corrosion Testing, Part II: Description of Three Test Methods, Dec. 35
- A Chromium-Free Conversion Coating for Aluminum, Dec. 46
- Decorative Plating on Aluminum, Dec. 16
- A Status Report on Art Form and Decorative Applications for Color Anodizing, Dec. 9
- Surface Preparation of the All-Aluminum Car Body before Painting, Dec. 57
- Thin Anodic Aluminum Oxide Films with Unusual Morphology, Dec. 27
- American Chemical Society (ACS), detection limit methodology of, Apr. 64
- Amine additives, for improving stability of phosphate coatings, June 89
- Amine vapor catalyst, in no-bake curing of urethanes, Jan. 62
- Annual Reviews
Technical Developments in 1992: Inorganic "Metallic" Finishes, Processes, and Equipment, Feb. 13
- Technical Developments in 1992: Organic Coatings, Processes and Equipment, Feb. 13
- Anodes and accessories
anodes in electropolishing of high nickel alloys, June 103
- hardcoat distribution, June 114
- white nickel plate, June 114
- Anodizing
accelerated corrosion testing, Sept. 50, Dec. 35
- acid etch primers, Aug. 67
- art form and decorative applications for color anodizing, Dec. 8
- blue finish for titanium, May 53
- brush plating and anodizing for the aircraft and aerospace industries, Mar. 27
- hard anodizing, Aug. 33
- hard coating 319 castings, May 53
- heat exchanger failure, May 53
- inorganic "metallic" finishes, Feb. 16
- integral black anodizing on magnesium alloys, June 57
- poor black color in, May 53
- prolonging anodizing seal bath life, Oct. 33
- starch media blasting for aerospace finishing applications, Mar. 15
- thin anodic aluminum oxide films with unusual morphology, Dec. 27

- Anticorrosion primers, monitoring of filiform corrosion under, July 51
- Antimony and antimony alloys
citrate solutions in electrodeposition of, Jan. 57
- converting silver brighteners, Feb. 62
- Atmosphere, effect of on automotive chassis coatings, May 43
- Audits, in quality control, June 66
- Augmented energy deposition, coating adhesion and, Sept. 15
- Automatic process control, on-line measurement in, Oct. 45
- Automotive finishing
atmospheric exposure of automotive coatings, May 43
- surface preparation of all-aluminum car body before painting, Dec. 57
- Automotive Finishing
Automated Rinsing/Drying of Truck Bodies to Improve Final Paint Finish, Oct. 51
- Automotive Applications of Electroless Nickel, Oct. 70
- The Leading Edge of Electrodeposition Technology, Oct. 59
- New Rotary Bell for Metallic Paint Application, Oct. 39
- On-Line Measurement of Paint Appearance on Car Bodies, Oct. 45
- Recycling of Water-Based Paint, Oct. 23
- B
- Barium, electrodeposition of, Feb. 21
- Bent strip method, for assessing internal stress in electrodeposited alloys, Apr. 59
- Benzene-m-disulfone (BDS), effects of on electroformed nickel alloys, June 107
- Beryllium-copper alloy, electroless nickel on, Dec. 61
- Best available control technology (BACT), compliance with, July 43
- Black carbon paints, for spacecraft, June 57
- Black electrolytic process, high-speed, development of, Feb. 20
- Blackening, of electroless nickel, Dec. 61
- Blistering
during reflow, Jan. 63
- on leaded brass, Feb. 62
- phosphating treatment for car bodies with aluminum alloy parts, Apr. 7
- poor adhesion and, May 53
- Blocked accelerator, in urethane coatings, Jan. 62
- Blushing, polyurethane coating and, June 82
- Bonding adhesives, removal of, Mar. 17, Mar. 18
- Boron and boron alloys, autocatalytic nickel-phosphorus-boron alloys, May 19, July 47, Aug. 23
- Brass
blisters on leaded brass, Feb. 62
- brown spots on plated surfaces, July 26
- electroless nickel on copper, Dec. 61
- failed adhesion test, July 26
- high finish for reflectors, June 114
- matching bronze finishes, Apr. 72
- pickling in hydrochloric acid, Feb. 62
- poor adhesion and, May 53
- refinishing leaded brass, Dec. 61
- Bridging

by metallic whisker of two contact surfaces, Apr. 38
of neighboring circuits, Feb. 57
Brightening, steel media for, July 9
Bronze
matching bronze finishes, Apr. 72
pickling in hydrochloric acid, Feb. 62
Brown spots, on plated surfaces, July 26
Brush plating, for the aircraft and aerospace industries, Mar. 27
Buffing
buffing equipment and supplies, Sept. 41
of inorganic "metallic" finishes, Feb. 16
replacing buffering operations, July 41
Bulk electropolishing, three methods of, Feb. 41

C

Cadmium
electrodeposition of, Feb. 17
powdery yellow coating on, Oct. 33
Calibration, science and art of, Jan. 39
Cantilever beam method, for assessing internal stress in electrodeposited alloys, Apr. 59
Capture efficiency, versus transfer efficiency, Oct. 69
Car bodies, with aluminum alloy parts, phosphate treatment for, Apr. 7
Carbon
adsorbents for control of VOC emissions, Nov. 68
in electropolishing surgical needles, Sept. 55
Carbon dioxide blasting, overview of, Sept. 9
Cathodes
in electropolishing, Feb. 41, June 103
hardcoat distribution and, June 114
Cathodic breakdown test, for accelerated corrosion testing, Dec. 35
Cathodic electrophoretic painting, phosphate coating stability and, May 51
Cathodic epoxy electrocoat, atmospheric effect on, May 43
Central rectifier, transistorized current regulator powered by, May 46
Centrifugal barrel finishing, overview of, July 15
Ceramic coatings, for machining, Apr. 19
Ceramic tile, conditioning, Aug. 68
Chains, masking, Nov. 50
Chelates, for aluminum etching, Apr. 73
Chelating cleaning formulations, effect of on metal precipitation, Aug. 51
Chemical agent-resisting coating (CARC) polyurethane camouflage, military use of, Dec. 11
Chemical hazards, in plating operations, recognition and control of, Nov. 41
Chemical polishing, high finish for brass reflectors and, June 114
Chemical resistance testing
for coatings, Mar. 7
in testing for adhesion, Feb. 61
Chlorofluorocarbons (CFCs), alternatives to in cleaning, Apr. 13
Chromate-free epoxy model primer, monitoring of filiform corrosion under, July 51
Chromic acid anodized coatings, accelerated corrosion testing and, Sept. 50
Chromium
analysis of chromium deposit as criteria for selection of trivalent chromium plating baths, Feb. 45
blisters on leaded brass, Feb. 62
brown spots on plated surfaces, July 26
electrochemical oxidation and ion exchange method for recovery of, Nov. 55
electrochemistry of chromium deposition from

a thiocyanato trivalent system, Apr. 53
electrodeposition of, Feb. 17
electropolishing surgical needles, Sept. 55
heat exchanger failure and, May 53
hexavalent, Nov. 73
passivating 400 series stainless steel and, Dec. 61

periodically reversed current influence on deposition of, Oct. 65
pinholes in chromium plate, Mar. 65
poor adhesion, May 53
poor coverage in recessed areas, July 26
Citrate, in electroless nickel plating, Apr. 45
Citrato-sulfate bath, electrodeposition of nickel-alloy alloys from, Jan. 57
Clean Air Act, accidental release of chemical vapors and, Nov. 41
Cleaning and chemical surface preparation
acid etch primers, Aug. 67
blisters on leaded brass, Feb. 62
chromium-free conversion coating for aluminum, Dec. 46
electroless copper bath operation for printed circuit boards, Jan. 33
capture efficiency, versus transfer efficiency, Oct. 69
of inorganic "metallic" finishes, Feb. 14
metal-cleaning alternatives for the 1990s, Apr. 13
overetching lead frames, Sept. 55
oxide removal from aluminum, July 26
pinholes in chromium plate, Mar. 65
priming inside and outside of tubes, Sept. 22
starch media blasting for aerospace finishing applications, Mar. 15
stop-off wax removal, May 53
surface oxidation of nickel plating in rinsing process, May 7
surfactant effects on porosity and corrosion resistance of zinc-phosphated steel, Aug. 43
testing for cleanliness of metal surfaces, Sept. 25

Cleaning and Pretreatment
Converting from Vapor Degreasing to the Optimum Alternative, Aug. 15
Effect of Cleaners on Metal Precipitation, Aug. 51
Effect of Surfactants on the Porosity and Corrosion Resistance of Zinc-Phosphated Steel, Aug. 43

Clean Water Act
prohibition of chemical discharge by, Apr. 64
reauthorization of, Nov. 35

Cobalt and cobalt alloys
citrate solutions in electrodeposition of, Jan. 57
electrodeposition of, Feb. 20
internal stress in electrodeposited, Mar. 42, Apr. 59
nickel-cobalt alloys, organic additive effects on electroformed, June 107

Coefficient of friction, testing for, Jan. 11
Coil coating, technical developments in, Feb. 52

Color anodizing, art form and decorative applications for, Dec. 8
Color matching, problems with, July 13
Composite electroplating, mechanisms of, June 97

Compressive stress
centrifugal barrel finishing and, July 15
steel media for imparting, July 9
Conductive coatings
adhesion to substrate, Feb. 60
in metallizing printed circuit boards, Feb. 23

Contact lubrication, tin and tin-lead contact

electrodeposits for electronic connectors and, Apr. 37

Continuous bulk machine, in bulk electropolishing, Feb. 41

Conversion coatings
acid etch primers and, Aug. 67
chromium-free conversion coating for aluminum, Dec. 46

conversion-type thick solar plating, Feb. 57
inorganic "metallic" finishes, Feb. 26
powdery yellow coating on cadmium, Oct. 33
surface preparation of all-aluminum car body before painting, Dec. 57

Cooling equipment, overview of, Aug. 39

Copper and copper alloys
acid copper electroplating solutions for printed circuit boards, May 23
acid etch primers, Aug. 67
bent diode leads, Feb. 62
blisters on leaded brass, Feb. 62
brown spots on plated surfaces, July 26
cleaner effects on copper precipitation, Aug. 51
conversion-type thick solar plating, Feb. 57
decorative plating on aluminum, Dec. 16
electrodeposition of, Feb. 18
electroless copper bath operation for printed circuit boards, Jan. 33

electroless nickel on copper alloys, Dec. 61
electroless plating of, Feb. 23
electrolytic plate-out of scrapped cyanide copper baths, Nov. 13

failed adhesion test, July 26
improving nickel adhesion to aluminum, Aug. 11
jewelry plating thickness, Jan. 63

pickling in hydrochloric acid, Feb. 62
plating on tellurium copper, Mar. 65
plating steel, Jan. 63

poor adhesion of to brass, May 53
poor leveling and brightness in acid copper, Nov. 50

roughness on plated plastic, Aug. 11
specifying copper sulfate, Nov. 50

Corrosion resistance
accelerated corrosion testing, Sept. 50, Dec. 35
autocatalytic deposition of nickel-phosphorus-boron alloys, Aug. 23

chromium-free conversion coating for aluminum, Dec. 46
filiform corrosion monitoring under anticoat primers, July 51

high molecular weight polymers, Oct. 59
nonionic surfactant as phosphating additive, Nov. 65

oxide removal from aluminum, July 26
phosphating treatment for car bodies with aluminum alloy parts, Apr. 10

process features and corrosion performance in phosphating as related to additive functionality, Jan. 17

surface preparation of all-aluminum car body before painting, Dec. 57

surfactant effects on porosity and corrosion resistance of zinc-phosphated steel, Aug. 43

tin and tin-lead contact electrodeposits for electronic connectors, Apr. 37
zinc-manganese alloy electrodeposition, Aug. 34

Cratering, in wet paint, Oct. 30

Cryolite, in phosphating treatment for car bodies with aluminum alloy parts, Apr. 7

Cushioned abrasives, for off-hand finishing, July 41
Cyanide

electrolytic plate-out of scrapped cyanide copper baths, Nov. 13
removal of from zinc plating wastewaters, May 36

Cyclic voltammetry, in assessing electrochemistry of chromium deposition, Apr. 53

D

DC polarography, in assessing electrochemistry of chromium deposition, Apr. 53

Deburring
centrifugal barrel finishing and, July 15
of snap rings, Dec. 61
steel media for, July 9
of surgical devices, Oct. 33

Deburring and Surface Conditioning, conference program and exhibitors, Oct. 19

Decorative plating
on aluminum, Dec. 16
color anodizing in, Dec. 8

Degreasing
adhesion failure and, Oct. 30
alternative methods for, Apr. 13
of aluminum, July 13
stop-off wax removal and, May 53
vapor, converting from, Aug. 15

Dehydration, phosphate coating stability and, May 51

Descaling
centrifugal barrel finishing for, July 15
of inorganic "metallic" finishes, Feb. 15

Detergent-type amines, effect on properties of phosphate coatings, Aug. 43

Diode leads, bent, Feb. 62

Direct current, in electrodeposition from citrate-sulfate bath, Jan. 57

Drying times, handling two on one line, Sept. 22

E

Edge coverage, high molecular weight polymers for, Oct. 59

Electrical surface resistance, of aluminum samples, Dec. 59

Electrical varnish, stripping, Nov. 23

Electrochemical oxidation, in recovery of chromium, Nov. 55

Electrocomposites, inorganic "metallic" finishes and, Feb. 25

Electroforming
of inorganic "metallic" finishes, Feb. 25
of jewelry, Nov. 50
organic additive effects on electroformed nickel alloys, June 107

Electrogalvanizing, in surface preparation of all-aluminum car body before painting, Dec. 60

Electroless plating
autocatalytic nickel-phosphorus-boron alloys, May 19, July 47, Aug. 23

automotive applications of electroless nickel, Oct. 70

blackening of electroless nickel, Dec. 61

of copper, Feb. 23

correlating electrochemical data and process parameters in electroless nickel plating, Apr. 45

electroless copper bath operation for printed circuit boards, Jan. 33

electroless nickel on copper alloys, Dec. 61

of gold, Feb. 24

gold plating on magnesium alloys for space applications, Mar. 34

improving nickel adhesion to aluminum, Aug. 11

of inorganic "metallic" finishes, Feb. 23
of nickel, Feb. 24

of nickel polyalloys, Feb. 25

roughness on plated plastic, Aug. 11

treating spent electroless nickel baths, July 26

yellow-brown stains on electroless nickel, Sept. 55

Electrolytes

electrolytic effluent treatment for acid or cyanide zinc plating baths, May 36

in electropolishing of high nickel alloys, June 103

high-speed black electrolytic process, Feb. 20

plate-out of scrapped cyanide copper baths, Nov. 13

sp'rytch immersion plate and, Aug. 11

th. anodic aluminum oxide films with unusual morphology, Dec. 27

trivalent chromium plating baths and, Feb. 45

zinc-manganese alloy electrodeposition and, Aug. 34

Electronic connectors, tin and tin-lead contact electrodeposits for, Apr. 37

Electronics Finishing

Fundamentals of Electroless Copper Bath Operation for Printed Circuit Boards, Jan. 33

How to Recycle Your Precious Metal Scrap, Jan. 43

Tin-Lead Plating on Encapsulated Semiconductor Lead Frames, Jan. 27

Electrophoresis, in recycling of water-based paint, Oct. 25

Electropolishing

of high nickel alloys, June 103

of inorganic "metallic" finishes, Feb. 16

of surgical needles, Sept. 55

three methods of bulk electropolishing, Feb. 41

Electrowinning, in recovery of chromium, Nov. 55

Emulsion coatings, handling two drying times on one line and, Sept. 22

Enamel coatings

coating damage during assembly, Aug. 67

poor adhesion and, Aug. 68

Encapsulation, of semiconductor lead frames, Jan. 27

Energy-dispersive X-ray spectrometry (EDX), in trivalent chromium plating, Feb. 45

Engineering drawings, specifying, Apr. 72

Environmental Coating Problems (column)

Determining VOC Content, Dec. 30

Determining VOC Content in a 55-gal Drum, Dec. 31

Emissions Inventory from Purchase Records, Dec. 30

Transfer Efficiency versus Capture Efficiency, Oct. 69

Understanding VOCs: Pounds per Gallon of Solids or Pounds per Gallon of Solids Applied, Oct. 68

What You Need to Do When an Agency or EPA Inspector Samples Your Coatings, Nov. 30

Why the Need for Elaborate, Accurate Recordkeeping?, Sept. 61

Environmental concerns

for coating facilities, Aug. 31

environmental compliance for organic finishers, June 93, July 43

low discharge limits, Apr. 64

recycling of metal scrap, Jan. 43

surface preparation of all-aluminum car body before painting, Dec. 57

venting nickel sulfamate, Mar. 64

Environmental Focus (column)

Clean Water Reauthorization: Round Two, Nov. 35

Performance Oriented Packaging Standards, July 55

RCRA Reauthorization, Jan. 47

Subpart S Regulations, Mar. 57

Toxic Release Inventory Reporting for 1992, May 49

Water Quality Guidance for the Great Lakes System, Sept. 35

Environmental Protection Agency (EPA)

detection limit methodology of, Apr. 69

performance oriented packaging standards and, July 55

sampling of coatings by, Nov. 30

Subpart S regulations of, Mar. 57

water quality guidance for the Great Lakes system and, Sept. 35

Epoxies, technical developments in, Feb. 53

Epoxy glass, plating of, Jan. 33

Epoxy primers

adhesion to substrate, Feb. 60

monitoring of filiform corrosion under, July 51

Ergonometic stress, reduction of, July 41

Etching

of inorganic "metallic" finishes, Feb. 15

overetching lead frames, Sept. 55, Nov. 50

in surface preparation of all-aluminum car body before painting, Dec. 57

Evaporation

coating adhesion and, Sept. 15

in recycling of water-based paint, Oct. 25

F

Facility design, in designing new paint line, July 13

Fatigue failure, resistance to, centrifugal barrel finishing and, July 15

Federal Aviation Administration (FAA), in finishing, Mar. 31

Filamentary growth, of metals on metals, Apr. 37

Filiform corrosion, monitoring of under anticorrosion primers, July 51

Finishing Equipment

Agitation Techniques for Electroplating Printed Circuit Boards, May 23

Electrolytic Effluent Treatment for Acid or Cyanide Zinc Plating Baths, May 36

A Transistorized Current Regulator Powered by a Central Rectifier for Continuous Plating Lines, May 46

Finishing in the '90s

LOD, LOQ, MDL and PQL: The Driving Force of the Next Generation of Regulations, Apr. 64

Metal-Cleaning Alternatives for the 1990s, Apr. 13

Phosphate Treatment for Car Bodies with Aluminum Alloy Parts, Apr. 7

Significant Characteristics of Tin and Tin-Lead Contact Electrodeposits for Electronic Connectors, Apr. 37

Ternary (Ti,Al)N and (Ti,Nb)N Coatings Produced by Steered Arc Ion Plating, Apr. 19

Finishing '93, conference program and exhibitors, Oct. 17

Fish eyes, in wet paint, Oct. 30

Flaking, of zinc plate, Dec. 61

Flootation surfactants, in phosphating, Jan. 17

Fluoride ion, in phosphating treatment for car bodies with aluminum alloy parts, Apr. 8

Fluoroinserted organic cleaning, overview of, Apr. 15

Foaming adhesives, removal of, Mar. 17

For Platers Only (column)
Controlling Gold Usage: Part I, Feb. 37
Controlling Gold Usage: Part II, Mar. 11
Controlling Gold Usage: Part III, May 33
Controlling Gold Usage: Part IV, June 85
Controlling Gold Usage: Part V, July 34
Hexavalent Chromium: A Champion on the Ropes?, Nov. 73
Old Platers Never Die, Aug. 47
A Short Course in Selling to Electroplaters, Jan. 15
Tools of the Trade, Oct. 55
Fretting corrosion, tin and tin-lead contact electrodeposits for electronic connectors and, Apr. 40

G

Gas tightness, base metal contacts and, Apr. 40
Gloss, losing, Sept. 22
Gold
additive for high-speed gold, Jan. 63
controlling gold usage, part I, Feb. 37
controlling gold usage, part V, July 34
controlling gold usage, part II, Mar. 11
controlling gold usage, part III, May 33
controlling gold usage, part IV, June 85
electrodeposition of, Feb. 20
electroless plating of, Feb. 24
gold plating on magnesium alloys for space applications, Mar. 34
plating gold on silver, June 114
recycling of precious metal scrap, Jan. 43
splotchy immersion plate and, Aug. 11
substitutions for in electronic connectors, Apr. 37
Tiffany gold, Apr. 73
Good Days and Bad Days (column)
People in Finishing: Alphabet Soup, Jan. 50
People in Finishing: Carbon Dioxide Blasters, Sept. 9
People in Finishing: Electrocoaters, Part I, Dec. 14
People in Finishing: Educators, July 45
People in Finishing: The Federal Aviation Administration, Mar. 31
People in Finishing: Hard Anodizers, Aug. 33
People in Finishing: Large Part Platers, Feb. 9
People in Finishing: Mechanical Galvanizers, May 13
People in Finishing: Naval Ordnance Finishers, Part I, Oct. 35
People in Finishing: Naval Ordnance Finishers, Part II, Nov. 27
People in Finishing: Regulatory Compliance Consultants, Apr. 33
People in Finishing: Vacuum Impregnators, June 69
Grit blasting, carbon dioxide blasting compared to, Sept. 9
Gugliemi's model, of composite electroplating mechanisms, June 97

H

Hard coating
brush plating and anodizing for the aircraft and aerospace industries, Mar. 28
hardcoat distribution, June 114, Aug. 11
319 castings, May 53
Hardness tests, in testing for adhesion, Feb. 61
Hastelloy, electropolishing of, June 103
Health hazards, in plating operations, Nov.

41
Heard on the Hotline (column)
Plating Shop of the '90s: Containment, Nov. 51,
Heating and cooling
electroless nickel-phosphorus-boron alloys, May 19
hard coat anodizing 319 cast aluminum castings, May 53
heat exchanger failure, May 53
heat-quench test for adhesion, Feb. 62
improving nickel adhesion to aluminum, Aug. 11
integral black anodizing on aluminum alloys, June 57
pinholes in chromium plate, Mar. 65
prolonging anodizing seal bath life, Oct. 33
splotchy immersion plate, Aug. 11
in surface oxidation of nickel plating, May 7
High build coatings, versus high solids, July 44
High-impact flat-spray nozzles, spray rinsing and drying system using, Oct. 51
High molecular weight polymers, in electrocoating, Oct. 59
High-solids coatings, technical developments in, Feb. 52
Hopeite, phosphate coating stability and, May 51
Hot dipping of inorganic "metallic" finishes, Feb. 26
in surface preparation of all-aluminum car body before painting, Dec. 60
tin-lead plating on encapsulated semiconductor lead frames, Jan. 27
HVLP spray guns for application of aerospace coatings, Aug. 59
blistered coatings and, Aug. 67
transfer efficiency of, June 81
Hydrocarbon immersion cleaning, overview of, Apr. 14
Hydrochloric acid, pickling in, Feb. 62
Hydrogen embrittlement, fundamentals of, Mar. 54
Hydrophobicity, flotation surfactants in imparting, Jan. 17
Hypophosphite, in electroless nickel plating, Apr. 45

I

Image analysis, as tool for filiform corrosion measurement, July 51
Immersion coatings, inorganic "metallic" finishes and, Feb. 26
Immersion plate, splotchy, Aug. 11
Immersion testing, of organic coatings, Mar. 8
Impact tests, in testing for adhesion, Feb. 61
Incoming inspection, alternatives to, June 65
Inconel, electropolishing of, June 103
Inorganic "metallic" finishes, technical developments in, Feb. 13
Instron trace, in measuring coefficient of friction, Jan. 11
Integral black anodizing, on aluminum alloys, June 57
Integrated circuit lead frames, solder plating of, Jan. 27
Interfacial contact plating adhesion, of soft base metal contact electrodeposits, Apr. 39
Interior finishing, starch media blasting for aerospace finishing applications and, Mar. 16
Intermetallics, formation of, Jan. 27
Internal stress of cobalt and nickel electrodeposits, Mar. 42, Apr. 59
reducing agent, effects of on electroformed nickel alloys, June 107

International Grinding, conference program and exhibitors, Oct. 19
International Union of Pure and Applied Chemistry (IUPAC), detection limit methodology of, Apr. 64
Ion exchange systems developments in, Mar. 50
in recovery of chromium, Nov. 55
Ion plating, in improving coating adhesion, Sept. 15
Iron and steel atmospheric effects on automotive chassis coat, May 43
corrosion-resistant nickel-iron alloy, June 107
iron phosphate coating stability, May 51
oxide removal from aluminum, July 26
pickling in hydrochloric acid, Feb. 62
phosphate coating stability and, May 52
plating steel, Jan. 63
poor adhesion, Aug. 68
potential-time measurements and, Sept. 57
priming inside and outside of tubes, Sept. 22
process features and corrosion performance in phosphating as related to additive functionality, Jan. 17
steel weldments, July 44
surface preparation of all-aluminum car body before painting, Dec. 60
surfactant effects on porosity and corrosion resistance of zinc-phosphated steel, Aug. 43
yellow-brown stains on electroless nickel in steel plating, Sept. 55
ISO 9000, in quality control, June 67

J

Jewelry
electroformed, Nov. 50
plating thickness for, Jan. 63
Job shop, quality of, Apr. 28
Joining techniques, for corrosion protection of all-aluminum car, Dec. 57

K

Kovar
pickling in hydrochloric acid, Feb. 62
splotchy immersion plate and, Aug. 11

L

Lack of control, idea of, Feb. 33
Large-part plating, characterization of, Feb. 9
Lead and lead alloys
blisters on leaded brass, Feb. 62
cleaner effects on lead precipitation, Aug. 51
conversion-type thick solar plating, Feb. 57
failed adhesion test, July 26
overetching lead frames, Sept. 55, Nov. 50
refinishing leaded brass, Dec. 61
tin and tin-lead contact electrodeposits for electronic connectors, Apr. 37
tin-lead plating on encapsulated semiconductor lead frames, Jan. 27
Limit of detection (LOD), concept of, Apr. 64
Limit of quantitation (LOQ), concept of, Apr. 66
Loss, definition of quality in terms of, Oct. 9
Low discharge limits, problems associated with, Apr. 64

M

Magnesium and magnesium alloys
gold plating of for space applications, Mar. 34
integral black anodizing on aluminum alloys, June 57
whiter nickel plate and, June 114
Magnetic abrasive finishing, overview of, July

Magnetic properties, of cobalt and nickel electrodeposits, Mar. 42, Apr. 59
Manganese and manganese alloys
 hard nickel-manganese alloy, June 107
 in phosphate coating stability, May 52
 zinc-manganese alloy electrodeposition, Aug. 34

Masking

chains, Nov. 50

relays, Aug. 11

Mass finishing
 centrifugal barrel finishing, July 15
 of inorganic "metallic" finishes, Feb. 16
 of surgical devices, Oct. 33

Mass transport, agitation techniques for electroplating printed circuit boards and, May 23

Matrix data analysis, in quality control, Mar. 60

Mechanical Finishing

Centrifugal Barrel Finishing: More Than Precision Deburring and Surface Finishing, July 15

Cushioned Abrasives for Off-Hand Finishing, July 41

Finishing with Steel Media: More Than Just a Bright Look, July 9

Magnetic Abrasive Finishing, July 21

Mechanical galvanizing, overview of, May 13

Mechanical grinding, in surface preparation of all-aluminum car body before painting, Dec. 57

Meeting Previews and Reports

AESF Sur/Fin '93—Technical Program and Exhibits, June 19

Three Shows in One—Finishing '93, Deburring and Surface Conditioning, and International Grinding, Oct. 17

Metallic paints, rotary bell for application of, Oct. 39

Metallic whisker growth potential, in electrical malfunction of plated condensers, Apr. 38

Metallizing nonconductors, inorganic "metallic" finishes and, Feb. 23

Metal precipitation, effect of cleaners on, Aug. 51

Meteorologic pollutants, effect of on automotive chassis coatings, May 43

Method detection level (MDL), concept of, Apr. 69

Method detection limit (MDL), concept of, Apr. 66

Methyl chloroform, alternatives to in cleaning, Apr. 13

MIL-STD 45662 guidelines, for acceptable calibration system, Jan. 40

Mixing, insufficient, Mar. 64

Monel, electropolishing of, June 103

MTM model, of composite electroplating mechanisms, June 97

Multiple-cation phosphating processes, for improving stability during electrocoating, May 51

N**New Books**

Anodic Coating Defects—Their Causes and Cures, Aug. 94

Electrodeposition: The Materials Science of Coatings and Substrates, July 72

Electrophoretic Composite Coating, Aug. 94

RCRA Regulatory Compliance Guide, June 158

Nickel and nickel alloys

autocatalytic nickel-phosphorus-boron alloys,

July 47, Aug. 23

automotive applications of electroless nickel, Oct. 70

blackening of electroless nickel, Dec. 61

blisters on leaded brass, Feb. 62

brown spots on plated surfaces, July 26

brush sulfamate nickel deposition, Mar. 27

citrate solutions in electrodeposition of, Jan. 57

cloudy nickel plate, Nov. 50

correlating electrochemical data and process parameters in electroless nickel plating, Apr. 45

electrodeposition of, Feb. 18

electroless nickel on copper alloys, Dec. 61

electroless nickel-phosphorus-boron alloys, May 19

electroless plating of nickel, Feb. 24

electroless plating of nickel polyalloys, Feb. 25

electrolytic plate-out of scrapped cyanide copper baths, Nov. 13

electropolishing of high nickel alloys, June 103

improving nickel adhesion to aluminum, Aug. 11

insufficient mixing, Mar. 64

internal stress in electrodeposited, Mar. 42, Apr. 59

jewelry plating thickness, Jan. 63

nickel-cobalt alloy, June 107

phosphating treatment for car bodies with aluminum alloy parts, Apr. 7

in plating gold on silver, June 114

poor adhesion of to brass, May 53

powdery yellow coating on cadmium, Oct. 33

refinishing leaded brass, Dec. 61

roughness on plated plastic, Aug. 11

spent electroless nickel baths, July 26

stress reducer in nickel sulfamate bath, May 53

sulfamate-nickel, masking relays, Aug. 11

surface oxidation of nickel plating in rinsing process, May 7

venting nickel sulfate, Mar. 64

whiter nickel plate, June 114

Woo's nickel strike analysis, Feb. 62

Wood's nickel strike for plating on Inconel, Mar. 65

yellow-brown stains on, Sept. 55

zinc-nickel effluent removal, May 36

Niobium alloys, ternary coatings produced by steered arc ion plating and, Apr. 19

Nitrogen, ternary coatings produced by steered arc ion plating and, Apr. 19

No-bake curing, of urethanes, Jan. 62

Noble metals, substitutions for in electronic connectors, Apr. 37

Nonchelating cleaning formulations, effect of on metal precipitation, Aug. 51

Nonionic surfactant, as phosphating additive, Nov. 65

O

Off-hand finishing, cushioned abrasives for, July 41

On-line monitoring, effective, Sept. 57

Organic additives, effects of on electroformed nickel alloys, June 107

Organic coatings

environmental compliance and, June 93

solvent and chemical resistance, Mar. 7

technical developments in, Feb. 49

testing, Jan. 11

Organic solvents, in fluorinated organic cleaning, Apr. 15

OSHA, Hazard Communication Standard of, Nov. 41

Oxide films

on bright nickel-plated surfaces, May 7

removal of from aluminum, July 26

in tin and tin-lead contact electrodeposits for electronic connectors, Apr. 37

Oxidizing conditions, agitation techniques for electroplating printed circuit boards and, May 23

Ozone-depleting substances, alternatives to in cleaning, Apr. 13

P**Paint coatings**

adhesion to substrate, Feb. 60

automated rinsing/drying of truck bodies to improve final paint finish, Oct. 51

blistered coatings, Aug. 67

blushing, June 82

cathodic electrophoretic painting, May 51

coating damage during assembly, Aug. 67

coating over rust, Aug. 67

color matching, July 13

cratering and fish eyes, Oct. 30

facility design, July 13

handling two drying times on one line, Sept. 22

HVLP spray guns, June 81

loss of gloss, Sept. 22

low-cost transfer-efficient paint spray equipment, Aug. 59

on-line measurement of paint appearance on car bodies, Oct. 45

overbaking, Nov. 23

phosphating treatment for car bodies with aluminum alloy parts, Apr. 7

poor adhesion, Aug. 68

poor degreasing can cause adhesion failures, Oct. 39

priming inside and outside of tubes, Sept. 22

recycling of water-based paint, Oct. 23

robot paint spraying, June 81

rotary bell for metallic paint application, Oct. 39

solvent entrapment, July 13

stripping of, Feb. 55

surface preparation of all-aluminum car body before painting, Dec. 57

two-component epoxy, June 81

viscosity, June 82

Painting equipment

handling two drying times on one line, Sept. 22

loss of gloss, Sept. 22

Palladium and palladium alloys

electrodeposition of, Feb. 20

recycling of precious metal scrap, Jan. 43

roughness on plated plastic and, Aug. 11

People in Finishing (See Good Days and Bad Days column)

Performance oriented packaging standards, overview of, July 55

Periodically reversed current, influence of on chromium deposition, Oct. 65

pH

cleaner effects on zinc precipitation, Aug. 51

electroless nickel-phosphorus-boron alloys, May 19

electrolytic plate-out of scrapped cyanide copper baths, Nov. 13

phosphate coating stability, May 51

splotchy immersion plate, Aug. 11

testing spent electroless nickel baths, July 26

Phosphating

for car bodies with aluminum alloy parts, Apr. 7

nonionic surfactant as phosphating additive, Nov. 65

phosphate coating stability, May 51, June 89

potential-time measurements and, Sept. 57

process features and corrosion performance in phosphating as related to additive functionality, Jan. 17
in surface preparation of all-aluminum car body before painting, Dec. 59
surfactant effects on porosity and corrosion resistance of zinc-phosphated steel, Aug. 43
Phosphoric acid, for oxide removal from aluminum, July 26
Phosphorus and phosphorus alloys autocatalytic nickel-phosphorus-boron alloys, May 19, July 47, Aug. 23
Physical vapor deposition (PVD) processes in application of decorative coatings, Feb. 21 coating adhesion and, Sept. 15 steered arc ion plating and, Apr. 19
Pickling in hydrochloric acid, Feb. 62 of inorganic "metallic" finishes, Feb. 15
Pinholes, in chromium plate, Mar. 65
Plastic, plated, roughness on, Aug. 11
Plastic media blasting, substrate damage and, Mar. 15
Plating methods and equipment plating processes additive for high-speed gold, Jan. 63 agitation techniques for electroplating printed circuit boards, May 23 alternate for zincating aluminum, Oct. 33 analysis of chromium deposit as criteria for selection of trivalent chromium plating baths, Feb. 45 bent diode leads and, Feb. 62 blue or yellow tin plate, June 114 brown spots on plated surfaces, July 26 brush plating and anodizing for the aircraft and aerospace industries, Mar. 27 cloudy nickel plate, Nov. 50 controlling gold usage, May 33 conversion-type thick solar plating, Feb. 57 correlating electrochemical data and process parameters in electroless nickel plating, Apr. 45 decorative plating on aluminum, Dec. 16 electroless nickel-phosphorus-boron alloys, May 19 electroless plating, Feb. 23 failed adhesion test, July 26 gold plating on magnesium alloys for space applications, Mar. 34 high finish for reflectors, June 114 influence of periodically reversed current on chromium deposition, Oct. 65 insufficient mixing, Mar. 64 masking relays, Aug. 11 pickling in hydrochloric acid, Feb. 62 plating gold on silver, June 114 plating on tellurium copper, Mar. 65 poor coverage in recessed areas, July 26 rectifier arrangement for continuous reel-to-reel plating, May 46 refinishing leaded brass, Dec. 61 roughness on plated plastic, Aug. 11 splotchy immersion plate, Aug. 11 strip and selective plating, Feb. 27 surface oxidation of nickel plating in rinsing process, May 7 tin-lead plating on encapsulated semiconductor lead frames, Jan. 27 whiter nickel plate, June 114 yellow-brown stains on electroless nickel, Sept. 55
Plating preparation cycles, for inorganic "metallic" finishes, Feb. 15
Platinum and platinum alloys

electrodeposition of, Feb. 20 recycling of precious metal scrap, Jan. 43 Polarization curves, in electroless nickel plating, Apr. 45
Polishing, of inorganic "metallic" finishes, Feb. 16
Pollutants, effect of on automotive chassis coatings, May 43
Pollution control, best available control technology compliance and, July 43
Pollution Control Choosing the Right Adsorption Medium for VOC Control, Nov. 68
An Electrochemical Oxidation and Ion Exchange Method for Recovery of Chromium, Nov. 55
Electrolytic Plate-Out of Scrapped Cyanide Copper Baths, Nov. 13
Rotor Concentrator Systems Remove VOCs from Spray Booth Exhaust, Nov. 60
Polyurethane coatings adhesion to substrate, Feb. 60 best available control technology compliance, July 43
blushing, June 82
ceramic tile and, Aug. 68 single-component, Dec. 11 solvent entrapment, July 13 starch media blasting for aerospace finishing applications, Mar. 15 technical developments in, Feb. 53
Powder coatings determining moisture content of, Nov. 23 equipment for, July 37 pretreatment for, Feb. 49 technical developments in, Feb. 50
Practical quantitation limit (PQL), concept of, Apr. 68
Precious metals acid etch primers and, Aug. 67 adhesion to substrate, Feb. 60 blue finish for titanium, May 53 controlling gold usage, part I, Feb. 37 controlling gold usage, part V, July 34 controlling gold usage, part II, Mar. 11 controlling gold usage, part III, May 33 controlling gold usage, part IV, June 85 electrodeposition of, Feb. 19 electropolishing surgical needles and, Sept. 55 gold plating on magnesium alloys for space applications, Mar. 34 in heat exchangers, May 53 plating gold on silver, June 114 plating on tellurium copper, Mar. 65 recycling of precious metal scrap, Jan. 43 roughness on plated plastic and, Aug. 11 splotchy immersion plate, Aug. 11 substitutions for in electronic connectors, Apr. 37
Tiffany gold, Apr. 73 tumbling of media and equipment, Oct. 33
Pre-treatment, technical developments in, Feb. 49
Priming, inside and outside of tubes, Sept. 22
Printed circuit boards agitation techniques for electroplating, May 23 electroless copper bath operation for, Jan. 33 surface-mount technology in production of, Feb. 57
Process capability (C_{pk}), overview of, Feb. 34
Processing steps, reducing, July 41
Process modeling, on-line measurement in, Oct. 45
Product Showcase Buffing Equipment and Supplies, Sept. 41 Cooling Equipment, Aug. 39

Ion Exchange, Mar. 50
Powder Coating Equipment, July 37
Vacuum Coating, Dec. 43
Programmed for Success (column)
Getting Started, Oct. 13
Lesson 1: Files and Fonts, Dec. 22
Pull-off technique, in testing for adhesion, Feb. 60
Purchase records, emissions inventory from, Dec. 30
Pyrophosphate, in electroless nickel plating, Apr. 45

Q

Quality control automated rinsing/drying of truck bodies to improve final paint finish, Oct. 51 total quality management and, Sept. 44 water quality guidance for the Great Lakes system, Sept. 35
Quality Control (column)
Economic Justification of Expenditures, May 38
Employee Appreciation, Dec. 39
Get the Picture?, Nov. 17
Goal-Oriented Management, Sept. 63
Job Shop Quality, Apr. 28
Matrix Data Analysis, Mar. 60
Preparing for Tomorrow's Success, Aug. 19
The Science and Art of Calibration, Jan. 39
Taguchi on Quality, Oct. 9
Understanding Sampling Errors, Feb. 33
Vendor Certification, July 28
Vendor Prequalification, June 65

R

Rack electropolishing, future of, Feb. 43
Radius, generating, centrifugal barrel finishing for, July 15
Reactive diluents, overview of, May 17
Recycling electrolytic effluent treatment for acid or cyanide zinc plating baths, May 36 of precious metal scrap, Jan. 43 of water-based paint, Oct. 23
Reducing agents, in electroless deposition, Apr. 45
Redundant air agitation, in copper bath, Jan. 33
Reel-to-reel plating gold utilization and, June 86 rectifier arrangement for, May 46 for solder plating integrated circuit lead frames, Jan. 27
Refineries, in recycling of precious metal scrap, Jan. 43
Refinishing, of leaded brass, Dec. 61
Reflectors, high finish for, June 114
Relays, masking, Aug. 11
Reliable detection level (RDL), concept of, Apr. 69
Reliable quantitation level (RQL), concept of, Apr. 69
Resource Conservation and Recovery Act (RCRA), reauthorization of, Jan. 47 Rhodium, recycling of precious metal scrap and, Jan. 43
Ribbon test, in testing for adhesion, Feb. 61
Rinsing process, surface oxidation of nickel plating in, May 7
Robot paint spraying, of automotive wheels, June 81
Rotary bell, for metallic paint application, Oct. 39
Rotating cylinder electrode, in zinc-manganese alloy electrodeposition, Aug. 34

Rotor concentrator systems, for removal of VOCs from spray booth exhaust, Nov. 60
Rust
coating over, Aug. 67
priming inside and outside of tubes, Sept. 22

S

Safe workplace, regulations and procedures for ensuring, Nov. 41
Salt-spray tests
in accelerated corrosion testing, Dec. 35
replacement of, Sept. 50
Sampling errors, understanding, Feb. 33
Scanning electron microscopy (SEM) of conversion-type thick solar plating, Feb. 57
of metallic whisker growth, Apr. 38
of trivalent chromium plating, Feb. 45
Scratch tests, in testing for adhesion, Feb. 60
Selective plating, of inorganic "metallic" finishes, Feb. 27
Selenium, electrodeposition of, Feb. 21
Semiaqueous cleaning, overview of, Apr. 13
Semiconductor lead frames, solder plating of, Jan. 27
Shadowgraphs, of metallic whisker growth, Apr. 39
Shop Problems (column)
Environmental Compliance for Organic Finishers, May 17, June 93, July 43, Aug. 31
Paints and Coatings, June 81, July 13, Aug. 67, Sept. 22, Oct. 30, Nov. 23, Dec. 11
Plating and Anodizing, May 53, June 114, July 26, Aug. 11, Sept. 55, Oct. 33, Nov. 50, Dec. 6.
Shot peening, of aircraft gas turbine engine components, Mar. 21
Silver
adhesion to substrate, Feb. 60
converting silver brighteners, Feb. 62
electrodeposition of, Feb. 20
high finish for brass reflectors, June 114
plating gold on silver, June 114
recycling of precious metal scrap, Jan. 43
Simple random sample, overview of, Feb. 33
Skin effect, in gold plating, Mar. 34
Slip resistance, of coated metal surfaces, Jan. 11
Snap rings, deburring, Dec. 61
Sodium lauryl sulfate, effects of on electroformed nickel alloys, June 107
Solar selective coating, for use on aerospace components, June 57
Solder plating
conversion-type thick solar plating, Feb. 57
on encapsulated semiconductor lead frames, Jan. 27
Solder wettability, of bright nickel-plated surfaces, May 7
Solvent entrapment, polyurethane coatings and, July 13
Solvent resistance, organic coatings and, Mar. 7
Spot plating, of lead frames, Jan. 27
Spot tests, of organic coatings, Mar. 8
Spray booths
requirements for recycling of water-based paint, Oct. 23

rotor concentrator systems for removal of VOCs from exhaust from, Nov. 60
Spray coatings, transfer efficiency and, June 73, June 79
Spray rinsing and drying system, for truck bodies, Oct. 51
Sputtering, coating adhesion and, Sept. 15
Stainless steel
acid etch primers, Aug. 67
electropolishing surgical needles, Sept. 55
passivating 400 series stainless steel, Dec. 61
pickling in hydrochloric acid, Feb. 62
splotchy immersion plate, Aug. 11
tumbling of media and equipment, Oct. 33
Starch media blasting, for aerospace finishing applications, Mar. 15
Statistical process control, overview of, Nov. 17
Steel media, finishing with, July 9
Steered arc ion plating, ternary ceramic coatings produced by, Apr. 19
Stop-off wax, removing, May 53
Stress reducer, in nickel sulfate bath, May 53
Stripping
of electrical varnish, Nov. 23
of inorganic "metallic" finishes, Feb. 15, Feb. 27
starch media blasting for aerospace finishing applications, Mar. 15
technological developments in, Feb. 55
tin-lead plating on encapsulated semiconductor lead frames, Jan. 27
Structural film adhesives, removal of, Mar. 17
Substrate effects, autocatalytic nickel-phosphorus-boron alloys and, July 47
Surface finishing
centrifugal barrel finishing, July 15
steel media for, July 9
Surface-mount technology, applying solder for, Feb. 57
Surface oxidation, of nickel plating in rinsing process, May 7
Surfactants, in phosphating, Jan. 17, Nov. 65

T

Tafel plot extrapolation, for accelerated corrosion testing, Dec. 35
Tanks and linings
agitation techniques for electroplating printed circuit boards, May 23
chromium-free conversion coating for aluminum, Dec. 46
controlling gold usage, May 33
degreasing of aluminum, July 13
electroless copper bath operation for printed circuit boards, Jan. 33
pinholes in chromium plate, Mar. 65
priming inside and outside of tubes, Sept. 23
tank for vacuum impregnation, June 69
Tantalum, electrodeposition of, Feb. 20
Tarnish film penetration, tin and tin-lead contact electrodeposits for electronic connectors and, Apr. 37
Tellurium copper, plating on, Mar. 65
Ternary alloys, electroless deposition of, May 19
Ternary ceramic coatings, for machining, Apr. 19
Teme plate, atmospheric effect on, May 43
Testing and analysis
analysis of chromium deposit as criteria for selection of trivalent chromium plating baths, Feb. 45
determining transfer efficiency and VOC emissions, June 73, June 79
low discharge limits and, Apr. 64
of organic coatings, Jan. 11, Feb. 60, Mar. 7

shot peening of aircraft engine components, Mar. 25

Testing and Control
Accelerated Corrosion Testing, Part I: An Overview of 20 Possible Accelerated Corrosion Tests, Sept. 50
Achieving a Competitive Edge Through the Application of Total Quality Management, Sept. 44
Effective On-Line Monitoring: The Role of Potential-Time Measurements, Sept. 57
Is It Clean? Testing for Cleanliness of Metal Surfaces, Sept. 25
Testing Organic Coatings (column)
Adhesion to Substrate, Feb. 60
Coefficient of Friction, Jan. 11
Solvent and Chemical Resistance, Mar. 7
Thermal spraying, of inorganic "metallic" finishes, Feb. 22
Thin passivation, in surface preparation of all-aluminum car body before painting, Dec. 57
Thiocyanato trivalent system, electrochemistry of chromium deposition from, Apr. 53
Tin and tin alloys
bent diode leads, Feb. 62
blue or yellow tin plate, June 114
conversion-type thick solar plating, Feb. 57
electrodeposition of, Feb. 19
failed adhesion test, July 26
masking relays and, Aug. 11
non-wetting tin plate, Apr. 72
specifying tin-zinc plating, Apr. 73
tin and tin-lead contact electrodeposits for electronic connectors, Apr. 37
tin-lead plating on encapsulated semiconductor lead frames, Jan. 27
Titanium and titanium alloys
acid etch primers, Aug. 67
blue finish for, May 53
electropolishing surgical needles, Sept. 55
in heat exchangers, May 53
ternary coatings produced by steered arc ion plating, Apr. 19
three methods of bulk electropolishing, Feb. 41
tumbling of media and equipment, Oct. 33
Total quality management, principles and implementation of, Sept. 44
Trajectory model, of composite electroplating mechanisms, June 99
Transfer efficiency
determining, June 73, June 79
low-cost transfer-efficient paint spray equipment, Aug. 59
regulating, May 17
versus capture efficiency, Oct. 69
Transistorized current regulator, powered by central rectifier, May 46
Transmission electron microscopy (TEM), of metallic whisker growth, Apr. 39
1,1,1-Trichloroethane, alternatives to in cleaning, Apr. 13
Trivalent chromium plating, criteria for, Feb. 45
Tumbling, of media and equipment, Oct. 33
Turbulent eddy patterns, agitation techniques for electroplating printed circuit boards and, May 23
Two-component polyamide epoxy, sweat-in time and, June 81

U

Ultrafiltration, in recycling of water-based paint, Oct. 24
Urethane coatings, no-bake curing of, Jan. 62

V

Vacuum impregnation, overview of, June 69
Vacuum coating
of inorganic "metallic" finishes, Feb. 21
overview of, Dec. 43
Valdes' codeposition model, of composite
electroplating mechanisms, June 97
Vapor degreasing
converting from, Aug. 15
for stop-off wax removal, May 53
Vapor injection cure process, for no-bake curing
of urethanes, Jan. 62
Vendor data sheets, real-life experience and,
Nov. 23
Vibratory agitation, for electroplating printed
circuit boards, May 23
Volatile organic compounds (VOCs)
adsorption media for control of, Nov. 60, Nov.
68
best available control technology compliance
and, July 43
determining content of, Dec. 30
determining content of in 55-gal drum, Dec. 31
determining emissions, June 73, June 79
emissions inventory for, Dec. 30
high builds versus high solids, July 44
reactive diluents and, May 17
understanding, Oct. 68

W

Wash primers, pretreatment, Aug. 67
Waste treatment and recovery
chromium-free conversion coating for
aluminum, Dec. 46
electrochemical oxidation and ion exchange
method for recovery of chromium, Nov. 55

electrolytic effluent treatment for acid or
cyanide zinc plating baths, May 36
electrolytic plate-out of scrapped cyanide
copper baths, Nov. 13
of inorganic "metallic" finishes, Feb. 29
naval ordnance finishers and, Nov. 27
organic coatings and, Feb. 55
recycling of water-based paint, Oct. 23
recycling precious metal scrap, Jan. 43
treating spent electroless nickel baths, July 26
water quality guidance for the Great Lakes
system, Sept. 35

Water-based paint, recycling of, Oct. 23

Waterborne coatings
handling two drying times on one line, Sept. 22
high builds versus high solids, July 44
technical developments in, Feb. 52
viscosity of, June 82

Wavelength-dispersive X-ray spectrometry
(WDX), in trivalent chromium plating,
Feb. 45

Wetter, effects of on electroformed nickel alloys,
June 107

Wheat starch blasting, for aerospace finishing
applications, Mar. 15

Wood finishing, transfer efficiency and VOC
emissions in, June 73

Wood's nickel strike
analyzing, Feb. 62
for plating on Inconel, Mar. 65

Y

Yellow-brown stains, on electroless nickel, Sept.
55

Yellow chromating, for surface preparation of

all-aluminum car body before painting,
Dec. 57

Yellow powdery coating, on cadmium, Oct. 33
Yttrium, electrodeposition of, Feb. 21

Z

Zeolite adsorbents, for control of VOC
emissions, Nov. 60, Nov. 68

Zinc and zinc alloys
adhesion to substrate, Feb. 60
alternate for zincating aluminum, Oct. 33
atmospheric effects on automotive chassis coat,
May 43

cleaner effects on zinc precipitation, Aug. 51
decorative plating on aluminum, Dec. 16

electrodeposition of, Feb. 19

electrolytic effluent treatment for acid or
cyanide zinc plating baths, May 36

flaking of zinc plate, Dec. 61

immersion zincate in gold plating on
magnesium alloys, Mar. 34

improving nickel adhesion to zincated
aluminum, Aug. 11

nonionic surfactant as phosphating additive,
Nov. 65

phosphate coating stability, May 51, June 89
phosphating treatment for car bodies with

aluminum alloy parts, Apr. 7

potential-time measurements, Sept. 57

specifying tin-zinc plating, Apr. 73

surfactant effects on porosity and corrosion
resistance of zinc-phosphated steel, Aug.
43

zinc-manganese alloy electrodeposition, Aug.
34

Zincrometal, atmospheric effect on, May 43

AUTHOR INDEX

A

Abbas, M.H., May 19, July 47, Aug. 23
Altmayer, F., June 158
Aly, I.H., May 19, July 47, Aug. 23
Amadi, S.A., May 23
Archer, J.E., July 41
Armyanov, S., Mar. 42, Apr. 59
Athey, R.D., Jan. 11, Feb. 60, Mar. 7, Aug. 94

B

Bailey, P.G., Mar. 21
Baizudin, B.M., Dec. 27
Baldwin, P.C., May 46, Nov. 13
Ballway, B., Jan. 62
Baudrand, D., Oct. 70
Bhojaraj, H., Mar. 34
Bibber, J.W., Dec. 46
Bilurbina Alter, L., May 43
Boelens, S., Apr. 19
Breau, J.G., Jan. 57
Burke, T., June 81, July 13, Aug. 67, Sept. 22,
Oct. 30, Nov. 23, Dec. 11

C

Celis, J.P., Apr. 19, June 97
Chen, K.N., Feb. 45, Apr. 53
Chmielewski, A.G., Nov. 55
Chung, M.-F., Feb. 45
Ciesielski, T., Nov. 55
Comassar, D.M., Mar. 21
Corrigan, V.G., Oct. 59
Coulthard, M., Oct. 45
Crest, S., Oct. 13, Dec. 22
Crompton, D., Nov. 68

D

Dhonau, R., Jan. 47, Mar. 57, May 49, July 55,
Sept. 35, Nov. 35
Diehl, R.P., Apr. 37
Dini, J.W., Sept. 15
Donaldson, J., Jan. 15, Feb. 37, Mar. 11, May 33,
June 85, July 34, Aug. 47, Oct. 55, Nov. 73
Drohan, D., Nov. 60
Droniou, P., Dec. 57
Du, N., Jan. 57

Durkin, B., Oct. 70

E

Ebberink, J., Apr. 19
Ee, Y.H., Apr. 53
Ehmann, I., May 36
El-Mallah, A.T., May 19, July 47, Aug. 23
Ewert, S.A., Aug. 59

F

Felstein, S.R., Aug. 59
Flak, M., Nov. 55
Flott, L.W., Jan. 39, Feb. 33, Mar. 60, Apr. 28,
May 38, June 65, July 28, Aug. 19, Sept.
63, Oct. 9, Nov. 17, Dec. 39
Foley, D., Oct. 51
Fontaine, R., July 9
Foppen, R., Jan. 27
Forshee, A.G., Sept. 50, Dec. 35
Fransaer, J., June 97
Fukuta, K., Oct. 39
Furuyama, O., Apr. 7

G
Gabe, D.R., May 23, Aug. 34
Gad, M.R., May 19, July 47
Glasbergen, J., July 51
Goodenough, M.R., May 23
Gupta, A., Nov. 68

H
Hensel, K.B., Feb. 41
Hsieh, A.K., Feb 45, Apr. 53
Huang, C-H., June 107

I
Ishii, H., Apr. 7

J
Jamani, A., Aug. 34
Joseph, R., May 17, June 79, June 93, July 43,
Aug. 31, Sept. 61, Oct. 68, Nov. 30, Dec.
30

K
Kamitamari, T., Feb. 57
Kania, P., Oct. 45
Kaźmierczak, W., Nov. 55
Kellet, P., Dec. 8
Kierat, Z., Nov. 55
Kirchner, F.T., Aug. 51

Kobayashi, M., May 7
Krishnan, R.M., Oct. 65
Krulik, G.A., Jan. 33, Mar. 54
Krymsky, M.D., July 21
Kuhn, A.T., Sept. 25

L
Langan, J., Mar. 27
Lee, R.E., Sept. 44
Liesa Mestres, F., May 43
Lindstedt, J., Apr. 64

M
Mandich, N.V., Jan. 33, Mar. 54
Martinez, T., Aug. 59
Merchant, A.N., Apr. 13
Mohideen, J.Md., Mar. 34
Mooney, T., Nov. 51
Mounts, M.L., Aug. 15
Murata, M., Oct. 39
Murphy, M., Feb. 13, Feb. 49

N
Nair, U.B., Jan. 17
Nakaoka, Y., May 7
Narayananmurthy, H., Mar. 34
Nassar, M.M., May 19, July 47
Natarajan, S.R., Oct. 65, Dec. 16

Norris, J.C., Mar. 27

O
Oestreich, J., Mar. 15
Ohashi, Y., Oct. 39

P
Panjatcharam, M., Nov. 65
Pearson, B.R., Aug. 34
Pereira, E.C., Apr. 45
Piplani, D.P., Sept. 44, Nov. 41
Porter, T., Mar. 15
Pushpavanam, M., Dec. 16

R
Rokicki, R., June 103
Roland, W.A., Dec. 57
Roos, J.R., Apr. 19, June 97
Rosenberg, K.B., Jan. 43

S
Sadana, Y.N., Jan. 57
Sankara Narayanan, T.S.N., May 51, June 89,
Aug. 43, Sept. 57, Nov. 65
Shah, S., Aug. 51
Sharma, A.K., Mar. 34, June 57
Shibata, T., May 7
Shono, T., May 7
Snowden-Swan, L., June 73
Sotirova-Chakarova, G., Mar. 42, Apr. 59
Sriveeraghavan, S., Oct. 65
Stein, B., July 72
Subbayan, M., Jan. 17, June 89, Aug. 43, Nov.
65
Sudha, S., Dec. 16
Szmander, H., Nov. 55

T
Tanaka, S., Apr. 7
Thompson, R.A., Mar. 21
Toda, K., Oct. 39
Toeppe, R.J., Feb. 41
Tulinski, E.H., July 15

U
Urbański, T.S., Nov. 55

V
van Beelen, D.C., July 51
Vancoille, E., Apr. 19
Vidhya, M., Dec. 16

W
Wang, V., Apr. 13
Weiner, M., Jan. 50, Feb. 9, Mar. 31, Apr. 33,
May 13, June 69, July 45, Aug. 33, Sept. 9,
Oct. 35, Nov. 27, Dec. 14
Whalen, J.M., Mar. 21
Wilcox, G.D., Aug. 34
Wilhelm, F., Oct. 23
Wolynec, S., Apr. 45
Wormer, P., June 73

Y
Younan, M.M., May 19, July 47, Aug. 23

Z
Zabel, K., July 51
Zweers, B., July 51

DC POWER RECTIFIERS

Do you need these features?

- Automatic Voltage
- Automatic Current
- Constant Current Density
- Solid State Electronic
- Polarity Reversing
- Pulse Output
- Ramping Output

Clinton Power's dependable DC Power Rectifiers offer all these features. What's more, they're built to last and designed for easy serviceability.

TYPES OF CONTROL:

- TAP Switch
- Power-Stat
- SCR

PLATING RECTIFIERS FOR:

- | | |
|--------|--------|
| Brass | Nickel |
| Chrome | Silver |
| Copper | Tin |
| Gold | Zinc |

APPLICATION AREAS:

- Anodizing,
- E-Coating,
- Electro Forming,
- Milling,
- Stripping

SEND
FOR
FREE
CATALOG



Take a look at "ULTRA-PULSE"-the next generation of Square Wave Output power supplies.



CLINTON POWER

5200 Main St., P.O. Box 1396, Skokie, IL 60076

Phone: 708-675-5200 • Fax: 708-675-5208

Circle 004 on reader information card

